



FINAL DRAFT Technical Specification

ISO/DTS 19166

Geographic information — Building information modelling (BIM) to geographic information systems (GIS) conceptual mapping (B2GM)

ISO/TC 211

Secretariat: **SIS**

Voting begins on:
2025-08-01

Voting terminates on:
2025-10-24

Itch Standards
(<https://standards.itch.ai>)
Document Preview

ISO/DTS 19166

<https://standards.itch.ai/catalog/standards/iso/96c6c6bd-5f40-4812-8577-171b4805803f/iso-dts-19166>

ISO/CEN PARALLEL PROCESSING

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

iTeh Standards
(<https://standards.itih.ai>)
Document Preview

ISO/DTS 19166

<https://standards.itih.ai/catalog/standards/iso/96c6c6bd-5f40-4812-8577-171b4805803f/iso-dts-19166>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Abbreviated terms and notation	4
4.1 Abbreviated terms	4
4.2 UML notation	4
5 Conformance	4
6 Conceptual framework for BIM to GIS mapping	4
6.1 General	4
6.2 Conceptual overview	5
6.3 Mechanisms	5
7 BIM to GIS perspective definition	9
7.1 General	9
7.2 Mechanisms	9
7.2.1 General	9
7.2.2 Data view	10
7.2.3 Logic view	10
7.2.4 Style view	10
8 BIM to GIS element mapping	11
8.1 General	11
8.2 Mechanism	12
9 BIM to GIS LOD Mapping	13
9.1 General	13
9.2 Mechanism	14
Annex A (normative) Abstract test suite	16
Annex B (informative) B2G EM and LM example	18
Annex C (informative) Instance example using B2G PD	20
Annex D (informative) CityGML LOD model and mapping	21
Annex E (informative) LOD mapping rule description example	23
Bibliography	24

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 287, *Geographic Information*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO/TS 19166:2021), which has been technically revised.

The main changes are as follows:

- definitions 3.3, 3.9, 3.10 and 3.13 have been revised;
- [Figure 4](#), [Figure 5](#), [Figure 7](#), [Figure 9](#) and [Figure 10](#) have been revised.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Building information modelling (BIM) contains rich information related to building elements such as doors, walls, windows, MEP (mechanical, electrical and plumbing) and others. In addition, BIM models can include information about other features than buildings which are relevant to geographic information systems (GIS). From the viewpoint of GIS, there are many benefits related to using BIM information in GIS applications. Some examples are:

- a) indoor service implementation such as emergency management (routing, evacuation path finding under fire situation);
- b) outdoor–indoor linkage service, such as seamless navigation;
- c) effective facility/energy/environment management considering objects related BIM based on GIS.

Although there have been some attempts to harvest the rich information contained in BIM models and use it in GIS, there is no established way to map the information elements between the two modelling worlds. A proper mapping method is clearly required. Before the implementation of the information mapping, however, mapping mechanisms for linking appropriate information elements from BIM to GIS should be clearly defined. In addition, for the mapping mechanisms to work together, a conceptual framework for the mapping process based on open standards between BIM and GIS should be established.

This document provides the conceptual framework for BIM to GIS information mapping and required mapping mechanisms.

A brief explanation of each mapping mechanism is as follows:

- BIM to GIS perspective definition (B2G PD): Supports perspective information representation depending on the specific requirement such as the urban facility management (UFM). “Perspective” depends on the use case. For example, to manage the urban facilities, the required data should be collected from the various data sources, including the BIM model, and transformed to represent in the user-specific perspective. PD defines a data view to extract the data required and transform the information from the various data sources.
- BIM to GIS element mapping (B2G EM): Supports the element mapping from BIM model to GIS model. As the BIM and GIS model schemas are different, B2G EM requires a mapping rule specifying how to transform from a BIM model to a GIS model element.
- BIM to GIS level of detail (LOD) mapping (B2G LM): Supports the LOD mapping from BIM model to GIS model. LOD in GIS is a deliberate choice of data included/excluded from a model to satisfy certain use cases including visualization. The relevant geometric and other information for the LODs required in the target GIS model should be extracted/or queried from the BIM model. This can be defined by the LOD mapping ruleset.

This document is applicable to information query services such as UFM operation. BIM object visualization in GIS and other application services that require query processing depending on the relationship between BIM and GIS objects, either in the real or virtual world, will be able to use the mechanisms defined in this document for mapping the required information elements between the two systems. Although this document describes mapping information elements from BIM to GIS in general, the primary concern of this document is mapping BIM models to GIS models for visualization.

The conceptual mapping mechanism defined in this document uses existing international standards such as Geography Markup Language (GML) (ISO 19136-1^[1]) and Industry Foundation Classes (IFC) (ISO 16739-1^[2]). The Open Geospatial Consortium (OGC)’s *Land and Infrastructure Conceptual Model Standard (LandInfra)* (OGC 15-111r1^[3]) defines the information model of infrastructure such as roads. As LandInfra has been designed with a common conceptual model between the BIM and GIS communities, transferring information from LandInfra BIM models to LandInfra GIS models is usually reasonably straightforward. This document, therefore, concentrates on mapping from BIM models not based on LandInfra.